

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:

Saavedra et al.

Group Art Unit: unassigned

Divisional of Serial No. 08/344,157

Examiner: unassigned

Filed: April 22, 1997

For: BIOPOLYMER-BOUND NITRIC
OXIDE-RELEASING
COMPOSITIONS,
PHARMACEUTICAL
COMPOSITIONS
INCORPORATING SAME AND
METHODS OF TREATING
BIOLOGICAL DISORDERS
USING SAME

INFORMATION DISCLOSURE STATEMENT

Assistant Commissioner for Patents
Washington, D.C. 20231

Pursuant to 37 C.F.R. §§ 1.97 and 1.98, the references listed on the enclosed Form PTO-1449 are submitted for consideration by the Examiner in the examination of the above-identified patent application.

The full consideration of the references in their entirety by the Examiner is respectfully requested and encouraged. Also, it is respectfully requested that the references be entered into the record of the present application and that the Examiner place his or her initials in the appropriate area on the enclosed Form PTO-1449, thereby indicating the Examiner's consideration of each of the references.

The submission of the references listed on the Form PTO-1449 is for the purpose of providing a complete record and is not a concession that the references listed thereon are prior art to the invention claimed in the patent application. The right is expressly reserved to establish an invention date earlier than the above-identified filing date in order to remove any reference submitted herewith as prior art should it be deemed appropriate to do so.

Further, the submission of the references is not to be taken as a concession that any reference represents art that is relevant or analogous to the claimed invention. Accordingly, the right to argue that any reference is not properly within the scope of prior art relevant to an examination of the claims in the above-identified application is also expressly reserved.

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The Information Disclosure Statement is being filed:

- ☒ (a) within three months of the filing date of the patent application, (b) within three months of the date of entry into the national stage as set forth in 37 C.F.R. § 1.491 of the international application, or (c) before the mailing date of a first Office Action on the merits.
- ☐ **after** (a), (b), or (c) above, but before the mailing date of a final action under 37 C.F.R. § 1.113 or a Notice of Allowance under 37 C.F.R. § 1.311, and includes:
 - ☐ the Certification under 37 C.F.R. § 1.97(e) (see "Certification" below).
 - ☐ the fee of \$230 set forth in 37 C.F.R. § 1.17(p) (see "Fees" below).
- ☐ **after** the mailing date of a final action under 37 C.F.R. § 1.113 or a Notice of Allowance under 37 C.F.R. § 1.311, and includes the Certification under 37 C.F.R. § 1.97(e) (see "Certification" below), a Petition requesting consideration of the Information Disclosure Statement (see "Petition" below), and the Petition Fee set forth in 37 C.F.R. § 1.17(i) (see "Fees" below).

Copies Of The References

- ☐ Copies of the references listed on the enclosed Form PTO-1449 are enclosed herewith. Attached to each reference not in the English language is a concise explanation of the relevance pursuant to 37 C.F.R. § 1.98(a)(3).
- ☐ A copy of the foreign search report is enclosed herewith.
- ☒ The references listed on the enclosed Form PTO-1449 were previously identified in the parent application(s) of the present application, and copies of the references were furnished at that time. Accordingly, additional copies of the references are not submitted herewith, so as not to burden the file with duplicate copies of references. The Examiner is respectfully requested to carefully review the references in accordance with the requirements set out in the Manual of Patent Examining Procedure. In accordance with 37 C.F.R. § 1.98(d), the details of the parent application(s) relied upon for an earlier filing date under 35 U.S.C. § 120 in which copies of the references were previously furnished are set out below:

In re Appln. of Saavedra et al.
Divisional of Serial No. 08/344,157

U.S. APPLICATIONS		Status (<i>check one</i>)		
U.S. APPLICATIONS	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
1. 08/344,157	November 22, 1994		X	
2. 08/121,169	September 14, 1993	X		
3. 07/935,565	August 24, 1992	X		

Other Applications

☐ The Examiner's attention is directed to the following U.S. patent application(s):

U.S. APPLICATIONS		Status (<i>check one</i>)		
U.S. APPLICATIONS	U.S. FILING DATE	PATENTED	PENDING	ABANDONED
1. 0 /				
2. 0 /				
3. 0 /				

Certification

- ☐ The **undersigned attorney** hereby certifies that each item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign patent application not more than three months prior to the filing of the Information Disclosure Statement.
- ☐ The **undersigned attorney** hereby certifies that no item of information contained in the Information Disclosure Statement was cited in a communication from a foreign patent office in a counterpart foreign patent application or, to the knowledge of the attorney signing after making reasonable inquiry, was known to any individual designated in 37 C.F.R. § 1.56(c) more than three months prior to the filing of the Information Disclosure Statement.

Petition

- ☐ The undersigned attorney hereby petitions the Commissioner to consider this Information Disclosure Statement and the references listed on the enclosed Form PTO-1449 in the examination of the above-identified patent application.

Fees

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- ☒ No fee is owed by the applicant(s).
☐ The **IDS Fee of \$230.00** under 37 C.F.R. § 1.17(p) is enclosed herewith.
☐ The **Petition Fee of \$130.00** set forth in 37 C.F.R. § 1.17(i) is enclosed herewith.

Method Of Payment Of Fees

- ☐ Attached is a check in the amount of \$.
☐ Charge Deposit Account No. 12-1216 in the amount of \$. (A duplicate copy of this communication is enclosed for that purpose.)

Authorization To Charge Additional Fees

- ☒ If any additional fees are owed in connection with this communication, please charge Deposit Account No. 12-1216. (A duplicate copy of this communication is enclosed for that purpose.)

Instructions As To Overpayment

- ☒ Credit Account No. 12-1216.
☐ Refund

Date: April 22, 1997



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FORM PTO-1449 MODIFIED	U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE	ATTY. DOCKET NO. 61192	SERIAL NO. unassigned
INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use several sheets if necessary)		APPLICANT Saavedra et al.	
		FILING DATE April 22, 1997	GROUP unassigned

U.S. PATENT DOCUMENTS

EXAMINER'S INITIALS		PATENT NUMBER	ISSUE DATE	NAME	CLASS	SUBCLASS	FILING DATE IF APPROPRIATE
	AA	5,405,919	04/95	Keefer et al.			
	AB	5,250,550	10/05/93	Keefer et al.			
	AC	5,155,137	10/13/92	Keefer et al.			
	AD	5,094,815	03/10/92	Conboy et al.			
	AE	5,087,671	02/11/92	Loeppky et al.			
	AF	5,087,631	02/11/92	Shaffer et al.			
	AG	5,039,705	08/13/92	Keefer et al.			
	AH	4,985,491	01/15/91	Ohta et al.			
	AI	4,954,526	09/04/90	Keefer			
	AJ	4,952,289	08/28/90	Ciccone et al.			
	AK	4,921,683	05/01/90	Bedell			
	AL	4,708,854	11/24/87	Grinstead			
	AM	4,638,079	01/20/87	Inskip et al.			
	AN	4,482,533	11/13/84	Keith			
	AO	4,265,714	05/01/91	Nolan et al.			
	AP	3,153,094	10/10/64	Reilly			

FOREIGN PATENT DOCUMENTS

		DOCUMENT NUMBER	PUBLICATION DATE	COUNTRY	CLASS	SUBCLASS	TRANSLATION	
							YES	NO*
	AQ	469520	May 91	EP				
	AR	425154-A1	10/16/90	EP				
	AS	WO 89/12627	06/15/89	WIPO				
	AT	211789	07/25/84	DE				

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

	AU	Artybasheva et al., "Synthesis of 1-Alkoxy-3,3-Dialkyltriazene 2-Oxides from Alkoxyamines and Nitrosoamines," translates from <u>Zhurnal Organicheskoi Khimii</u> , (Journal of Organic Chemistry-U.S.S.R.) 28, (6) 1168-1173 (1987).
	AV	Bonakdar et al., "Continuous-Flow Performance of Carbon Electrodes Modified with Immobilized Fe(II)/Fe(III) Centers," <u>Calanta</u> , 36, 219-225 (1989).
	AW	DeFeudis, "Endothelium-Dependent Vasorelaxation - A New Basis for Developing Cardiovascular Drugs, <u>Drugs of Today</u> , 24 (2), 103-115 (1988).
	AX	DeLuca et al., "Parenteral Drug-Delivery Systems," in <u>Pharmaceutics and Pharmacy Practice</u> , Banker et al eds., 238-250 (J.B. Lippincott Co., Philadelphia, PA) (1982).

*A concise statement of relevance is being submitted in lieu of a translation. 37 CFR § 1.98(b).

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OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER'S INITIALS		
AY		Drago, "Reactions of Nitrogen(II) Oxide," in <u>Free Radicals in Organic Chemistry</u> , Advances in Chemistry Series No. 36, 143-149 (American Chemical Society, Washington DC) (1962).
AZ		Drago et al., "The Reaction of Nitrogen(II) Oxide with Various Primary and Secondary Amines," <u>J. Am. Chem. Soc.</u> , 83 , 1819-1822 (1961).
BA		Furchgott, "The Role of Endothelium in the Responses of Vascular Smooth Muscle to Drugs," <u>Am. Rev. Pharmacol. Toxicol.</u> , 24 , 175-97 (1984).
BB		Garg et al., "Nitric Oxide-Generating Vasodilators Inhibit Mitogenesis and Proliferation of Balb/C 3T3 Fibroblasts by a Cyclic GMP-Independent Mechanism," <u>Biochem. And Biophys. Res. Comm.</u> , 171 , 474-479 (1990).
BC		Gehlen et al., "Über Reaktionen und Eigenschaften des Stickoxyds und seiner Verbindungen (II.Mitteil): Zur Kenntnis der Salze der Stickoxyd-schwefligen Säure," <u>Berichte d. D. Chem. Gesellschaft</u> , LXV , 1130-1140 (1932). ("Reactions and properties of nitric oxide compound of sulfurous acid," <u>Chemical Abstracts</u> , 26 , 4764-65.)
BD		Hansen et al., "N-Nitrosation of Secondary Amines by Nitric Oxide via the 'Drago Complex'," in <u>N-Nitroso Compounds: Occurrence and Biological Effects</u> , IARC Scientific Publications No. 41, 21-29 (International Agency for Research on Cancer, Lyon, France) (1982).
BE		Hibbs et al., "Nitric Oxide: A Cytotoxic Activated Macrophage Effector Molecule," <u>Biochem. And Biophys. Res. Comm.</u> , 157 , 87-94 (1988).
BF		Holford et al., "Understanding the Dose-Effect Relationship: Clinical Application of Pharmacokinetic-Pharmacodynamic Models," <u>Clinical Pharmacokinetics</u> , 6 , 429-453 (1981).
BG		Ignarro, "Endothelium-Derived Nitric Oxide: Actions and Properties," <u>The FASEB Journal</u> , 3 , 31-36 (1989).
BH		Ignarro et al., "The Pharmacological and Physiological Role of a Cyclic GMP in Vascular Smooth Muscle Relaxation," <u>Ann. Rev. Pharmacol. Toxicol.</u> , 25 , 171-191 (1985).
BI		Ignarro et al., "Mechanism of Vascular Smooth Muscle Relaxation by Organic Nitrates, Nitrites, Nitroprusside and Nitric Oxide: Evidence for the Involvement of S-Nitrosothiols as Active Intermediates," <u>J. Pharmacol. Exp. Ther.</u> , 218 , 739-749 (1981).
BJ		Ignarro, "Nitric Oxide: A Novel Signal Transduction Mechanism for Transcellular Communication," <u>Hypertension</u> , 16 , 477-483 (1990).
BK		Ignarro, "Biosynthesis and Metabolism of Endothelium-Derived Nitric Oxide," <u>Ann. Rev. Pharmacol. Toxicol.</u> , 30 , 535-560 (1990).
BL		Jones, "Metastable Polymers of the Nitrogen Oxides. 1. Open Chain Nitric Oxide Analogues of Polythiazyl A MNDO/AM1 Study," <u>J. Phys. Chem.</u> , 91 , 2588-2595 (1991).
BM		Kruszyna et al., "Red Blood Cells Generate Nitric Oxide from Directly Acting, Nitrogenous Vasodilators," <u>Toxicol. Appl. Pharmacol.</u> , 91 , 429-438 (1987).
BN		Kuhn et al., "Endothelium-Dependent Vasodilation in Human Epicardial Coronary Arteries: Effect of Prolonged Exposure to Glycerol Trinitrate or SIN-1," <u>J. Cardiovasc. Pharmacol.</u> , 14 (Suppl. 11), S47-S54 (1989).
BO		Longhi et al., "Metal-Containing Compounds of the Anion (C ₂ H ₅) ₂ NN ₂ O ₂ ," <u>Inorg. Chem.</u> , 2 , 85-88 (1963).
BP		Lutz et al., "Isolation of Trioxodinitrato (II) Complexes of Some First Row Transition Metal Ions," <u>J. Chem. Comm.</u> , 247 (1977).
BQ		Maragos et al., "Complexes of •NO with Nucleophiles as Agents for the Controlled Biological Release of Nitric Oxide. Vasorelaxant Effects," <u>J. Med. Chem.</u> , 34 , 3242-3247 (1991).
BR		Marletta et al., "Unraveling the Biological Significance of Nitric Oxide," <u>BioFactors</u> , 2 , 219-225 (1990).

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OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

EXAMINER'S INITIALS		
BS	Middleton et al., "Further Studies on the Interaction of Nitric Oxide with Transition-Metal Alkyls," <u>J. Chem. Soc. Dalton</u> , 1898-1905 (1981).	
BT	Myers et al., "Vasorelaxant Properties of the Endothelium-Derived Relaxing Factor More Closely Resemble S-Nitrosocystein than Nitric Oxide," <u>Nature</u> , 345, 161-163 (1990).	
BU	Palmer et al., "Nitric Oxide Release Accounts for the Biological Activity of Endothelium-Derived Relaxing Factor," <u>Nature</u> , 327, 324-327 (1987).	
BV	Park et al., "Controlled Protein Release from Polyethyleneimine-Coated Poly(L-lactic Acid)/Pluronic Blend Matrices," <u>Pharmaceut. Res.</u> , 9, 37-39 (1992).	
BW	Smith et al., "Nitroprusside: A Potpourri of Biologically Reactive Intermediates," in <u>Advances in Experimental Medicine and Biology</u> , 283, <u>Biological Reactive Intermediates IV</u> , (Witmer et al., eds.), 365-369 (Plenum Press, New York, NY) (1991).	
BX	Smith et al., "Complex Contractile Patterns in Canine Colon Produced by Spontaneous Release of Nitric Oxide," <u>Gastroenterology</u> , 102, (4) Part 2, A516 (1992).	
BY	Stampler et al., "S-Nitrosylation of Proteins with Nitric Oxide: Synthesis and Characterization of Biologically Active Compounds," <u>Proc. Natl. Acad. Sci. USA</u> , 89, 444-448 (1992).	
BZ	Stampler et al., "S-Nitrosylation of Tissue-Type Plasminogen Activator Confers Vasodilatory and Antiplatelet Properties on the Enzyme," <u>Proc. Natl. Acad. Sci. USA</u> , 89: 8087-8091 (1992).	
CA	Stuehr et al., "Nitric Oxide: A Macrophage Product Responsible for Cytostasis and Respiratory Inhibition in Tumor Target Cells," <u>J. Exp. Med.</u> , 169, 1543-1555 (1989).	
CB	Trissel, "Intravenous Infusion Solutions," <u>Handbook on Injectable Drugs</u> , 4 th ed., 622-629 (American Society of Hospital Pharmacists, Bethesda, MD) (1986).	
CC	Weitz et al., "Zur Kenntnis der stickoxyd-schwefligen Säure (II.Mitteil)," <u>Berichte d. D. Chem. Gesellschaften</u> , LXVI, 1718-1727 (1933). ("Nitrosylsulfuric acid," <u>Chemical Abstracts</u> , 28, 2636.)	
CD	WHO Task Group on Environmental Health Criteria for Oxides of Nitrogen, <u>Environmental Health Criteria</u> 4: <u>Oxides of Nitrogen</u> , (World Health Organization, Geneva) (1977).	
CE	Wilcox et al., "Effect of Cyanide on the Reaction of Nitroprusside with Hemoglobin: Relevance to Cyanide Interference with the Biological Activity of Nitroprusside," <u>Chem. Res. Toxicol.</u> , 3, 71-76 (1990).	
CF	Off-Line Bibliographic Citation List Generated by <u>Medlars II</u> regarding :Nitric:Release: or :Release:Nitric (Excludes Proteins/Peptides (MH))	
CG	Off-Line Bibliographic Citation List Generated by <u>Medlars II</u> regarding Nitri:Oxide/Proteins/:Nitric:Release: or :Release:Nitric: (SENS).	
CH	Off-Line Bibliographic Citation List Generated by <u>Medlars II</u> regarding :Nitric:Donor: or :NO:Donor: (SENS).	
CI	Off-Line Bibliographic Citation List Generated by <u>Medlars II</u> regarding Nitri:Oxide/Peptides/:Nitric:Release: or :Release:Nitric:	
CJ	DIALOG Search Report regarding Nitric Oxide Complex(es).	
CK	DIALOG Search Report regarding Nitric Oxide and Releas?.	
CL	DIALOG Search Report regarding Nononate(s).	